Wireless @ Virginia Tech
Virginia Tech
432 Durham Hall
Blacksburg, VA 24061

April 7, 2011

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: Promoting Expanded Opportunities for Radio Experimentation and Market Trials under Part 5 of the Commission's Rules and Streamlining Other Related Rules, ET Docket No. 10-236; 2006 Biennial Review of Telecommunications Regulations – Part 2 Administered by the Office of Engineering and Technology (OET), ET Docket No. 06-105

Dear Ms. Dortch:

In order to correct a clerical error, Virginia Tech hereby refiles its Reply to Comments filed April 7, 2011 in the above-referenced dockets. The filing was marked as "COMMENTS" and should correctly be marked "REPLY TO COMMENTS."

Sincerely,

/s/

Michael J. Benonis

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Promoting Expanded Opportunities for Radio Experimentation and Market Trials under Part 5 of the Commission's Rules and Streamlining Other Related Rules	)	ET Docket No. 10-236
	)	
2006 Biennial Review of Telecommunications Regulations – Part 2 Administered by the Office Of Engineering and Technology (OET)	)	ET Docket No. 06-155

REPLY COMMENTS OF THE
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

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I. INTRODUCTION

1. Wireless @ Virginia Tech is a multidisciplinary program at Virginia Polytechnic Institute and State University (Virginia Tech)[1]. Research at Wireless @ Virginia Tech encompasses a wide range of areas, including antenna design, wireless networking, communications systems, micro-electronics, RF design, and system integration. Many of these research areas depend on real-world over-the-air tests to collect valuable research data.

[1] See http://www.wireless.vt.edu/ for more information on Wireless @ Virginia Tech.

2. Virginia Tech is currently the holder of three experimental licenses under Part 5 of the Commission's Rules. Two of these licenses[2] permit operation on a variety of frequencies in the VHF and UHF bands, and are used by Wireless @ Virginia Tech to conduct experiments using our 48-node Cognitive Radio Network Testbed (CORNET)[3]. Virginia Tech holds another experimental license[4] for research in TV White Spaces, and this license permits operation in the VHF and UHF TV bands, subject to prior coordination with the Society of Broadcast Engineers (SBE).

3. In its Notice of Proposed Rulemaking (NPRM) on Docket 10-236, the Commission proposes the creation of a Research Program Experimental License (RPEL). The RPEL would allow qualifying institutions to conduct radio frequency experimentation in the vast majority of the radio spectrum on its entire campus without applying for experiment-specific Part 5 licenses from the Commission. Virginia Tech fully supports the concept of a broad-scope license for qualifying institutions to conduct experiments using the radio spectrum. Such a license would give these institutions the ability to innovate at a much faster pace without undue regulatory burden.

4. In these comments, Virginia Tech will address interference concerns raised by a number of petitioners. In particular, we will focus on the CMRS (i.e., cellular) and Public Safety Two-Way Radio (Public Safety) bands which are the focus of a number of petitioners. Virginia Tech believes that experimentation can be performed safely in these bands as long as all parties involved follow careful procedures. We will also address questions raised by the Commission in the NPRM.

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[2] Call Signs WF2XGH and WE9XFK (available for viewing through the Commission's Experimental Licensing System at https://apps.fcc.gov/oetcf/els/index.cfm).
[3] *See* http://cornet.wireless.vt.edu/ for more information on CORNET.
[4] Call Sign WF2XPA (available for viewing through the Commission's Experimental Licensing System at https://apps.fcc.gov/oetcf/els/index.cfm).

II. CMRS AND PUBLIC SAFETY LICENSEES MUST BE PROTECTED FROM INTERFERENCE, BUT THEIR BANDS MUST BE OPEN FOR EXPERIMENTATION

5. The Commission states in the NPRM[5] that "[w]e seek to find a balance that allows research organizations the greatest level of flexibility to experiment – particularly in high-value bands that may host the newest generation of consumer devices and applications – in order to unlock enormous economic and social benefits, while respecting the fundamental principle that experiments must be designed to avoid harmful interference to existing services."

6. The CMRS and Public Safety bands are arguably some of the most high value bands, and as such should not be categorically excluded from the RPEL. However, we do recognize the high potential for interference and harm to the general welfare that experimentation in these bands could produce.

A. Experimentation In The CMRS Bands Should Be Permitted

7. Verizon and WACE petition the Commission to prohibit any experimental operation in the CMRS bands. In their comments, Verizon states[6] "[w]hile Verizon Wireless supports the concept of program experimental authorizations, universities, research organization, and health care facilities should not be permitted to use licensed CMRS spectrum for experiments given the high likelihood of harmful interference being caused to commercial operations."

8. We do not agree with Verizon's suggestion for a blanket exclusion of the CMRS bands from RPEL licensees. With proper safeguards, we believe that it will be possible to conduct safe experimentation in these bands that will lead to the development of new and exciting technologies.

9. AT&T, Inc. ("AT&T") takes a more reasonable approach to RPEL experimentation in the CMRS bands. AT&T proposes[7] that RPEL licensees be required to directly notify all licensees of the CMRS bands of their intent to perform an experiment, and receive consent and coordination prior to

[5] *See* NPRM, ET Docket 10-236, at 19.
[6] *See* Verizon Comments, ET Docket Nos. 10-236 and 06-155 at 5.
[7] *See* AT&T Comments, ET Docket Nos. 10-236 and 06-155, at 5-6.

proceeding. AT&T further states that incumbent licensees should be required to negotiate in good faith in all cases.

10. We strongly agree with AT&T on these points. In particular, we see no problem with a requirement to obtain consent from licensees prior to operation. However, we submit that the Commission should *require* licensees to respond to all requests for coordination within two (2) weeks of notification, and that licensees should only be permitted to reject coordination and consent if it is deemed that there is a high likelihood of interference to subscribers. Incumbent licensees should not be permitted to simply reject requests for coordination without a full technical evaluation.

11. AT&T further lays out four more points with respect to experimentation in the CMRS bands[8]. AT&T states that RPEL licensees should be required to "bear the burden of demonstrating that an experiment will not cause interference." We agree with this position, and believe that RPEL licensees who cannot demonstrate that their experiment will not cause interference should not be permitted to experiment in *any* band.

12. AT&T agrees with the Commission in stating that REPL licensees must "identify a single point of contact who is ultimately responsible for all experiments conducted under the research license."[9] We also agree with this requirement. Further, we believe that this individual should have the technical and legal background necessary to understand all aspects of the experiment to be performed. In addition, this individual or his/her designee should be available for contact at any time that an experiment is being performed. This is common practice for engineers in the broadcast industry and should not represent an undue burden to RPEL licensees.

13. Finally, AT&T argues that the Commission should initially grant a limited number of RPEL licenses, and that operations should be restricted to fixed experiments only. We believe that these restrictions are necessary and prudent until they can be shown otherwise.

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[8] *Id.,* at 7-10.
[9] *Id.*, at 8.

B. Experimentation In The Public Safety Bands Should Be Permitted

14. In their comments, The Association of Public-Safety Communications Officials-International, Inc (APCO) petitions the Commission to include safeguards for RPEL licensees who wish to experiment in the public safety bands[10]. We agree with APCO's assessment. In particular, APCO cites the Commission in that licensees should show that experimentation is in the public interest, and that operation should require coordination. Similarly to the CMRS bands, we believe that these requirements do not represent an undue burden on RPEL licensees.

III. RESPONSE TO QUESTIONS RAISED BY THE COMMISSION IN THE NPRM

15. In the NPRM, the Commission raised a number of questions and requested responses to these questions. In this section, we seek to provide responses to these questions.

16. In paragraph 21, the Commission requests comment on what frequencies that RPEL licensees should be permitted to operate on. We agree with the Commission's suggestion to permit operation anywhere except on frequencies listen in §15.205(a), as well as on frequencies above 38.6 GHz with the exception of those listen in footnote US246 of the Table of Allocations. As we have discussed in Section II, we disagree with Verizon and others that CMRS (i.e., cellular) frequencies should be categorically excluded.

17. In paragraph 22, the Commission requests comment on where research should take place, and how strong signals outside of this area should be. We support the Commission's suggestion that licensees be responsible for ensuring that emissions do not cause harmful interference to users outside of the University's operation area, and do not believe that the Commission should specify specific field strength or power flex density levels. Qualified institutions should have the ability to evaluate radiofrequency activity in its vicinity using both appropriate test equipment and publically available data on the

[10] *See* APCO Comments, ET Docket Nos. 10-236 and 06-155, at 4-5.

Commission's website. This approach is very similar to the approach taken in the TV bands for Part 15 operation under ET Docket 04-186.

18. There may be situations where operation may be permitted under the Commission's rules without a license. An example of this is provided by Section 74.24, which permits licensed broadcast stations to operate remote-pickup ("RPU") stations on an itinerant basis. A recognized frequency coordinator typically coordinates these operations. We submit that RPEL licensees be required to evaluate whether their operations have the potential to cause interference (e.g., due to antenna location and proximity to other users). If the RPEL licensee believes that operation has the potential to cause interference, then they should be required to consult with the frequency coordinator and request coordination prior to operation.

19. With regard to transmitter location and power level, we propose that the maximum conducted power at the antenna terminals not exceed 1W. We derive this power level from Section 15.247 of the Rules, which deals with operation in the ISM and unlicensed bands at 915 MHz, 2.4 GHz, and 5.8 GHz. In these bands, the Commission has authorized a maximum power level of 1W at the antenna terminals and we believe that this should be more than sufficient for any experimental use. We submit that RPEL licensees be permitted to use any type of antenna necessary for the experiment, including experimental designs. Users requiring more power can simply apply for an experiment-specific license under Part 5. We do not believe that additional regulations are necessary with regard to transmitter or antenna location, as the RPEL licensee is wholly responsible for avoiding harmful interference to other users.

20. In paragraphs 26 and 27, the Commission discusses whether to require specific coordination with licensed users prior to commencing experimental operations. As we discussed in the previous paragraph, we support coordination in cases when the potential for interference exists. However, as we discuss in Section III, we propose that RPEL licensees be required to coordinate operations in the CMRS bands with the licensee prior to operation.

21. In paragraph 28, the Commission asks whether operation should be permitted in the Public Safety radio bands. This is a difficult question because many of the public safety bands occupy so-called "prime spectrum" where experimentation would be valuable. We believe that generally, operation should be permitted in these bands as long as operation does not cause harmful interference to licensed users.

22. In paragraph 31, the Commission asks whether there should be specific restrictions on bands used for delivering emergency information to the general public. We address concerns regarding the CMRS bands in Section III. With regard to other bands, such as campus security and public safety, AM, FM, and TV broadcast, we do not believe that there should be any other requirements aside from ensuring that the experiment does not cause harmful interference to licensees and users. We note that campuses typically have diverse methods of notifying persons of emergency situations, such as loudspeakers, electronic message boards, and wired closed-circuit television systems. First-hand knowledge suggests that these systems are more likely to reach larger populations than systems based on commercial carriers (such as text-notification systems, which in our experience are notoriously slow). We also note that cellular coverage in buildings is well known to be poor on most college campuses, and hence submit that commercial services should not serve as a primary means to disseminate emergency information.

23. In paragraph 32, the Commission asks how to address noncompliance with the rules. We submit that licensees be subject to immediate termination of specific experiments or the RPEL as a whole in the event of harmful interference. We agree with the Commission's assertion in paragraph 34 that organizations should have a single point of contact that is responsible for all operations under the RPEL on campus. We submit that the named individual should have the appropriate background and test equipment to carry out these tasks, and that the individual should have the full authority to stop any experiment at any time of day or night if harmful interference is detected or reported.

IV. SUMMARY AND CONCLUSION

24. Virginia Tech strongly supports the creation of the RPEL. By reducing the burden on institutions to file for Part 5 experimental licenses for every experiment that they perform, institutions will be able to quickly test new ideas while they are still fresh. By permitting experimentation in a wide range of bands, institutions will be able to test prototypes in the actual bands they will operate in, yielding better data on performance and bringing new concepts to market more quickly. We look forward to the Commission's Report and Order on this matter.

Respectfully submitted,

/s/

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